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THE FORESTRY BRANCH

FIFTH ANNUAL REPORT

1987-1988

MANITOBA NATURAL RESOURCES

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
ADMINISTRATION	4
FOREST MANAGEMENT	6
SILVICULTURE	26
FOREST PROTECTION AND DUTCH ELM DISEASE	32
THE FORESTRY INITIATIVES	44

TABLES AND CHARTS

TABLE 1:	FOREST INVENTORY PROJECTS 1987-1988	9
MAP 1:	FOREST INVENTORY DATA AUTOMATION	10
TABLE 2:	SUMMARY OF TIMBER CUT ON CROWN LAND	18
TABLE 3:	TIMBER CUT BY DEPARTMENTAL REGION	19
DIAGRAM 1:	PERCENTAGE OF TIMBER PRODUCED WITHIN DEPARTMENTAL REGIONS	20
TABLE 4:	RECORD OF TIMBER SCALED OR MANUFACTURED	21
TABLE 5:	REVENUE FROM THE SALE OF CROWN TIMBER	22
TABLE 6:	SUMMARY OF ANNUAL FOREST PRODUCTION BY FOREST PRODUCT	23
TABLE 7:	A COMPARISON OF PERMITS, LICENCES AND QUOTAS ON CROWN LANDS	24
TABLE 8:	A COMPARISON OF PERMITS AND LEASES IN PROVINCIAL FORESTS	25
TABLE 9:	1987-88 FOREST RENEWAL ACTIVITIES	31
TABLE 10:	SPRAY BLOCKS	35
TABLE 11:	LARVAL SURVEY RESULTS	36
TABLE 12:	JACK PINE VOLUME DATA FOR INDIVIDUAL STANDS	39
TABLE 13:	JACK PINE TREE CONDITIONS FOR INDIVIDUAL STANDS	40
TABLE 14:	AGREEMENT - SUMMATION BY PROGRAM	48
DIAGRAM 2:	FORESTRY ACTIVITY	49
DIAGRAM 3:	FORESTRY BRANCH ORGANIZATION CHART	50

FORESTRY BRANCH FIFTH ANNUAL REPORT - 1987- 1988

INTRODUCTION

The Forestry Branch continued to reach significant levels of success during the fiscal year ending March 1988. Programs, projects and activities were delivered according to schedule in all areas and actual expenditures were within one percent of budgeted goals. As in the previous year, the success achieved was due, for the most part, to the continued delivery of the Forestry Initiatives program, specifically involving the Canada-Manitoba Forest Renewal Agreement and the Manitoba Jobs Fund Sectoral Project in Forestry.

Forest renewal programs continued to show increases in the production, delivery and quality of planting stock. The tree seedling improvement activities appear to be paying off, both in terms of the quality and size of stock for the variety of planting sites that are found in Manitoba. The construction of a cold storage and packing shed which was completed at the Pineland Provincial Nursery in the late fall will ensure that top quality seedlings will be overwintered and available in prime condition for the spring planting program. The seedlings held in this state-of-the-art facility, both in bareroot and container format were the best overwintered seedlings ever produced by the Pineland Provincial Forest Nursery.

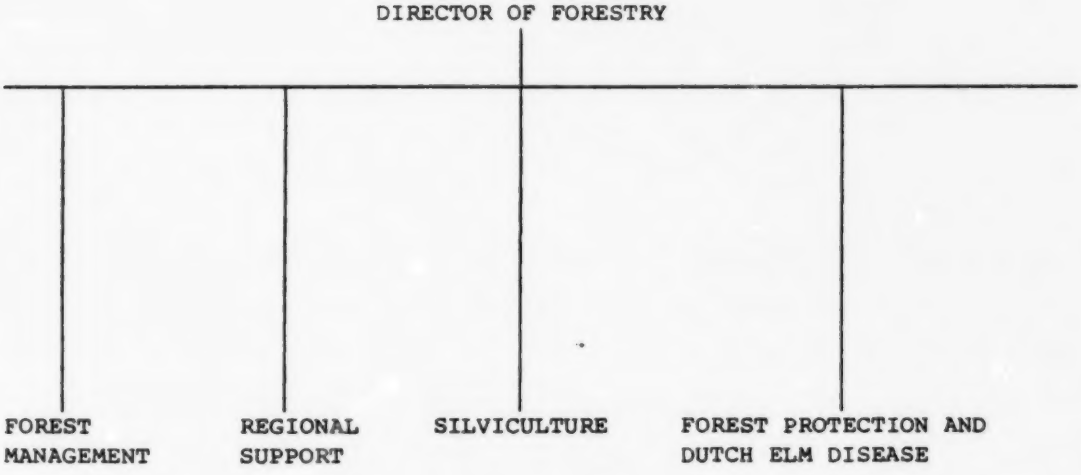
Stand tending programs initiated at the outset of the Forestry Initiative program indicate that the expected yields in both increased diameter and in height growth are being achieved. Both jack pine and black spruce stands that have been thinned are yielding as much as 30% to 50% increase in growth, unquestionably due to the release from competition in overstocked young stands. It is anticipated that the cost benefit analysis of these programs will indicate that they are indeed a high priority silvicultural technique to be considered in future branch programs.

The FORIST program, the Branch's geographic information system, is proving to be a highly valuable tool in the inventory and management of the province's forest resources. A second shift of station operators has proven to be an excellent means of increasing the rate at which the inventory and forest management data is loaded into the system. Work was initiated during the year to begin using loaded data on an operational basis and almost weekly new ways and means of using the data and speeding up processes are being achieved. The application of FORIST to forest areas that have undergone a change due to, for example, the Woodridge fire, have proven the system to be extremely valuable both from a fire control and enforcement point of view, as well as for providing an immediate update on the current status of the forest resource itself. During the year, a significant level of data loading has occurred and the program has focussed on those forest areas of the province where the greatest level of forest utilization and management activity occurs.

Vacancies within the organization, which have averaged about eight positions over the course of the twelve month period, have continued to plague the branch by placing unnecessary and additional workloads on existing staff. The assistance from Regional Services in the area of timber management and supervision has alleviated some of the problems where vacant positions were located in field and regional support offices. Field delivery of planting and site preparation programs were delivered on an increasing contractual basis. This particular strategy has improved the program delivery significantly, in spite of minor problems that plague the branch as a result of fine-tuning contractual obligations between the contractor and the branch.

Forest Protection programs, specifically in areas of jack pine dwarf mistletoe research and pest management research programs in nursery stock and planted and natural forests, continue to break new ground. The forest pest management and control program may be small when compared to other provinces, but in many cases Manitoba and the branch lead all others in a number of projects associated with common insect and disease problems, both in research and control.

The organization of the branch remains the same as in previous years and is illustrated briefly below. A more detailed organizational structure is appended to the back of this report.



ADMINISTRATION

The Administration Section of the Forestry Branch is responsible for the full operation and coordination of all administrative services within the Branch. This includes the financial commitment system, personnel, budget estimates, cash flows, computer coding, departmental equipment, vehicle requirements, accounts payable and receivable, and contracts. The Section also coordinates the administrative requirements for five regional offices, three district offices and three nursery offices.

This Section maintained financial control and accountability for the provincial share of the Canada-Manitoba Forest Renewal Agreement and Manitoba Jobs Fund Sectoral Project in Forestry.

The Forestry Branch 1987/88 fiscal year budget was allocated and expended as follows:

CURRENT BUDGET	SY's	BUDGETED	EXPENDED
A) Administration	7.0	343.8	343.8
B) Forest Inventory	19.0	727.0	719.8
C) Timber Management and Development	7.0	230.2	225.2
D) Silviculture	7.0	1,146.9	1,146.9
E) Forest Protection	25.42	1,982.6	1,932.4
F) Regional Management	21.0	935.7	929.5
G) Forest Renewal - Northern Development Agreement	16.26	2,061.9	2,061.9
Sub-Total Current Budget	103.16	7,428.1	7,359.5
Ongoing Capital - Equip.	--	25.0	25.0
Canada-Manitoba Forest Renewal Agreement	1.0	3,140.0	3,118.1
Manitoba Jobs Fund Sectoral Project	11.0	3,610.0	3,576.3
Total Forestry Budget 1987/88	115.16	14,203.1	14,078.9

The fourth annual Forestry Branch meeting involving all staff was held on June 9, 10 and 11, 1987 in Winnipeg. The meeting included business sessions and technical workshops. The field trip showed various forest renewal activities in the Eastern Region and included a tour of the Pineland Provincial Forest Nursery.

FOREST MANAGEMENT

A preliminary forest inventory report was prepared for the Swan Pelican Forest Area to provide basic information for the process of designating the area as a Provincial Forest.

Industrial development projects requiring a continuous wood supply were responded to during the year. Significant interest has been shown for industrial projects using Trembling Aspen. Re-calculations of annual allowable harvest levels for Trembling Aspen in all Forest Management Units of Manfor's specified area (25 Forest Management Units or portions thereof) were completed. Previous calculations of Trembling Aspen harvest volumes were based on the utilization of this species for sawlogs and lumber. The re-calculations were based on potential pulpwood utilization and resulted in potential significant increases in annually available volumes of Aspen where used for this product.

FOREST INVENTORY

Forest survey crews collected forest measurement data for the revision of the stand/stock volume table for Forest Management Units 83, 84, 85 and 87 in the Nelson River Forest Section.

The "FORIST" System (Forestry Geographic Information System) was augmented with a second shift in July, 1987. Both Shifts worked in the Lake Winnipeg East, Pineland and Interlake Forest Sections until January, 1988. At this time, the work areas were geographically separated to provide for the entry of forest cover data in the Mountain, Saskatchewan River and Highrock Forest Sections. As of March 31, 1988, Forest Management Units 20, 30, 35, 38 and 39 were completed and electronically stored covering an area of 26,450 km. Additional Forest Management Units were in various stages of processing.

Permanent sample plots designed to track forest growth changes over time are being established in representative forest stands across the Forest Zone of the Province. Permanent plots will be remeasured at five year intervals to establish growth trends and to permit prediction of volume accumulations in the future.

An examination of current forest site classification techniques and procedures for Manitoba is in progress in cooperation with the Northern Forest Research Centre of the Canadian Forestry Service. A test area for system application was selected over a range of forest growth conditions in the northeast corner of the Duck Mountain Provincial Forest. Procedures followed, information obtained and final results presented, indicate that a potential for major improvement in forest site classification land rating is possible using an integrated information approach based on climate, soil, landform, moisture and available forest cover detail presently available.

A review of current aerial photography use was initiated to examine the introduction of colour prints and colour transparancies at scales approaching 1:50,000. Trials were carried out in Southeastern Manitoba as part of the ongoing supplementary aerial photography program tracing timber harvest and reforestation operations. Better than expected success was achieved in obtaining the required information at a scale of 1:40,000. An examination of costs, results, and available equipment is continuing. A Procom-2 photo information transfer machine was purchased for the transfer of forest depletion and reforestation boundary and location information from any scale of aerial photography to the forest cover maps of an area. This will enter location and activity detail into the Geographic Information System.

Each of the Forest Management Projects is described in detail as follows:

AERIAL PHOTOGRAPHY

Forest Management Units 61, 65 and the south portion of 66 were scheduled for aerial photography. Due to weather and smoke from major wild fires the entire contract was not completed as planned. A total of 7,600 km^2 was completed out of a planned 11,200 km^2. The remaining 3,600 km^2 will be completed in 1988/89 in conjunction with an adjacent area located in the Highrock Forest Section.

MOSAICS

Two hundred and thirty air photo mosaics covering an area of 18,500 km^2 were assembled and photographically copied under the Jobs Fund Sectoral Project for 1987/88. Negatives for each mosaic (the Lake Winnipeg East Forest Section) were placed in the Survey Branch facilities so that copies could be sold to interested individuals and agencies.

PHOTO TYPING

Forest cover was delineated on new aerial photography for Forest Management Unit 31 and portions of 36 and 37 in the Lake Winnipeg East Forest Section covering a total of 9,810 km^2.

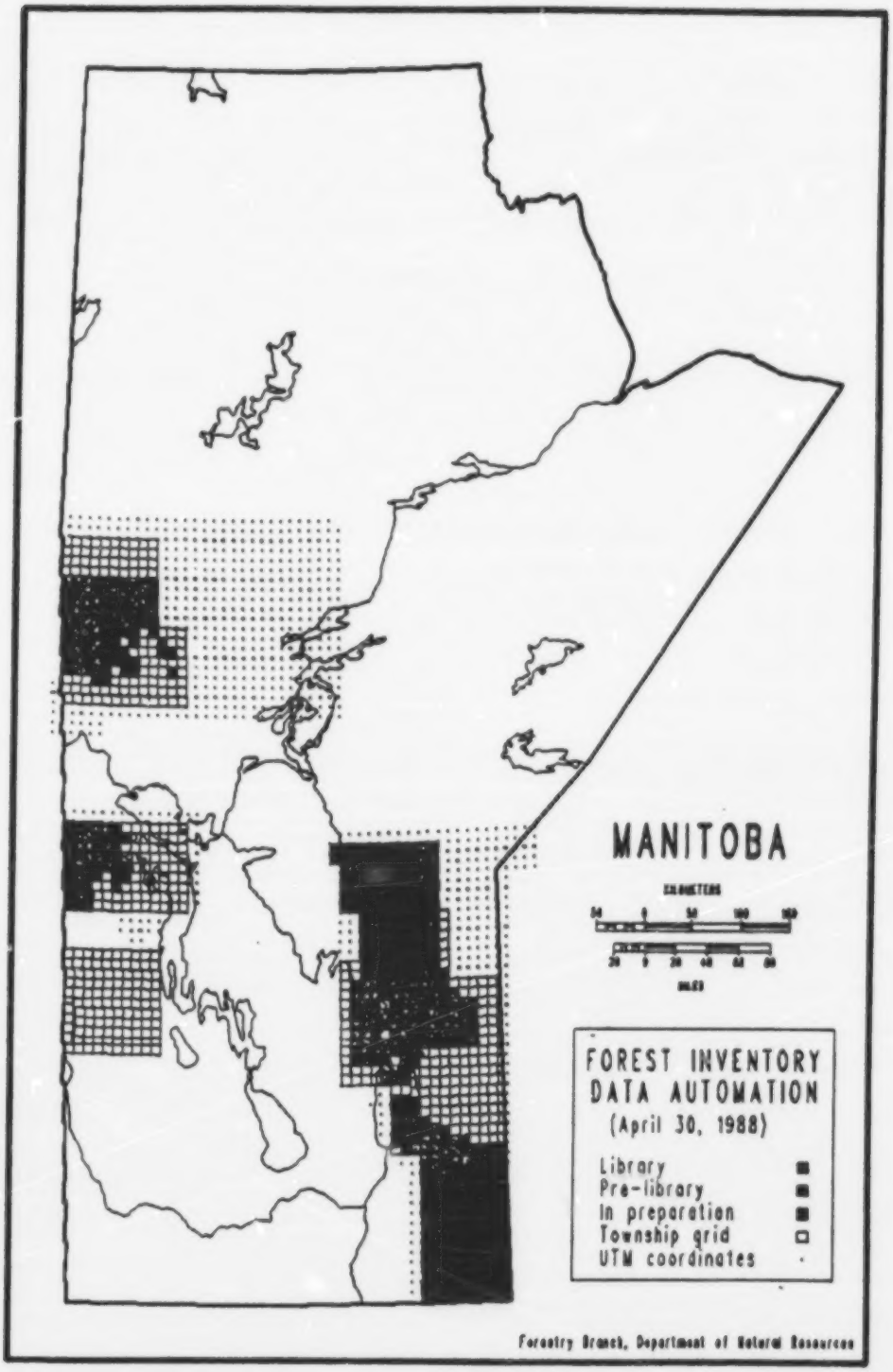
PRELIMINARY FOREST COVER MAPPING

Updated forest cover maps were completed for the remaining portions of F.M.U.'s 83, 84, 85 and 87 in the Nelson River Forest Section and portion of F.M.U. 31 in the Lake Winnipeg East Forest Section. The total area prepared totalled 12,940 km^2.

TABLE 1 FOREST INVENTORY PROJECTS
1987-1988

ACTIVITY	AREA IN SQUARE KILOMETERS
Aerial Photography	7,600
Forest Cover Mapping	12,940
Air Photo Interpretation	16,670
Forest Surveys	21,560
Area Compilation (FORIST Library)	25,060
Forest Inventory Reports	3,700
Township Air Photo Mosaics	18,500

MAP #1


MANITOBA
FOREST INVENTORY
DATA AUTOMATION
(April 30, 1988)
Library
Pre-library
In preparation
Township grid
UTM coordinates
Forestry Branch, Department of Natural Resources

PHOTOINTERPRETATION

Areas completed include the remaining portions of F.M.U.'s 82, 83, 84, 85 and 87 in the Nelson River Forest Section and a portion of F.M.U. 31 in the Lake Winnipeg East Forest Section for an area of 16,670 km^2.

FOREST SURVEYS

a) Resource Inventory

Forest Surveys were carried out in the Nelson River Forest Section on a limited update basis. The area involved in the survey covered 21,560 km^2. A total of 410 temporary plots were established and measured.

b) Growth and Yield

Fifteen permanent sample plots were established in the Nelson River Forest Section in natural stands. The plot locations selected for determining Manitoba's forest growth rates are in young stands of primarily one species on representative growing sites. The average number of trees found on the 15 plots established was an astonishing 607 (215 trees on the average in the Pineland Forest Section). One of the 15 plots contained 1,138 trees for a new record.

As part of the project, the location of all temporary and permanent sample plots are being entered into the Forestry Geographic Information System for future recall and analysis of actual measurements obtained at the year of forest survey. Compact portable Husky Hunter computers were used to record field measurements taken for direct entry into the Forestry computer. This introduction of technology proved very successful. Contact was made with regional and forest industry foresters in Manitoba to determine a framework priority for growth information needs. Responses from individuals were summarized to provide guidelines for subsequent activity sequences.

FORIST (Forestry Geographic Information System)

The loading of all available forest cover information into computer storage continues with increasing success. A second shift of data entry operators was added in July with initial staff acquisition and training carried out by members of the original operation. The following summary indicates the number of forest cover map sheets which are in progress or which have been fully completed and entered into the library for future analysis requirements:

	Map Sheets			
Year	In Progress	Ready for Library	In Library	Total Map Sheets
Apr. 1/87 - Mar. 31/88	65	29	303	397
Apr. 1/86 - Mar. 31/87	6	9	62	77
Aug. 30/85 - Mar. 31/86	14	-	20	34
Total	85	38	385	508

UTM Coordinates for positioning of forest cover map sheets into the computer are provided through the support of the Surveys Branch. This has a progressive sequence through forest areas based on the priority from a forest industrial utilization point of view.

Forest Management Units 20 and 30 have been completed with data provided in summary format as required for the preparation of Forest Inventory Reports and Annual Allowable Cut determination. This activity has begun.

Forest Management Units 35, 38, 39 and 63 are ready for volume and area processing when the data is required. Processing is on hold pending any wild fire occurrences that would be entered into the data base prior to area and volume calculation activities and report preparation. This will minimize the need to reprocess data at additional unnecessary cost.

The data manipulation capabilities of the FORIST System were tested in Forest Management Unit 20 where a major fire occurred. Its boundary was entered into the data base resulting in forest cover area and volume reductions being accounted for. In addition, major changes were made in Provincial Forest boundaries resulting in a reallocation of area and forest volumes from open Crown land to Provincial Forest land and redefinition of volumes available for harvest to established forest industries.

The first "stand alone" geographic information system was purchased and assembled into an operational unit. The purpose of the "stand-alone" system is to provide for direct activity information entry and subsequent impact analysis options as required for Forestry Regional offices across the Province, and Forestry Branch Section offices in Winnipeg. The communication link between the "stand-alone" units and the "FORIST" system will be by standard telephone line or surface mail initially. Computer program development to meet Forestry Regional office requirements has begun with the entry of timber sale locations and depletion and area entry into the data base. Computer assistance procedures for selecting alternate harvest areas for each timber sale entered have been developed in prototype format with test implementation to be carried out in the new year. Programming for silviculture data entry has commenced to enter plantation and stand improvement location data into the system.

WILDFIRE MANAGEMENT

All area and volume loss reports received before March, 1988 were processed for the 1987/88 fire year. However, a number of reports were received late in March which remained to be processed early in the new year.

TIMBER MANAGEMENT AND DEVELOPMENT

As in 1986/87, 1987/88 was a buoyant year for the forest products industry. Strength continued or improved throughout the major lumber and paper markets and coupled with the 80 cent Canadian dollar and favourable off-shore exchange rates, prices for the various forestry products held or increased substantially in a variety of sectors. Some forecasts, however, are for a leveling off or a down trend in the latter half of 1988 or early in 1989. Most mills, especially in the pulp and paper sector, reported operating at or near capacity throughout most of the year. This and a quiet labour scene allowed many companies to post new volume output highs and correspondingly substantial improvements.

Perhaps the most exciting market trends exhibited this past fiscal year were in the pulp and paper field. Northern bleached softwood Kraft prices topped $700. U.S. per ton delivered in Europe and projections call for this price trend to continue upwards, possibly going through the $800. per ton level by late 1988. Optimism in this chemical paper grade market/pulp field is encouraging and no doubt spilling over into the CTM and the newsprint paper market. The market outlook for next year is strong. Any new capacity coming on stream is expected to be almost immediately absorbed by the buoyant market. New mills slated for production in 1990/91, however, will be adding substantial capacity to a market which by then could have peaked and be on a down side.

Lumber markets remained fairly stable throughout the last fiscal year. The spruce/pine/fir prices ranged from a low of $180. to a high of $220. U.S. per thousand board feet throughout most of the year. Due to a strong demand, it would appear that the 15% self-imposed Canadian export tax on lumber to the U.S. had very little effect on production and prices. The decline of U.S. housing starts and the slightly increasing value of the Canadian dollar (versus the U.S. dollar), have some predicting a weakening of this market as early as the second half of 1988. The movement of the mortgage and interest rates combined with some possible labour unrest in the west coast forest industries could add or detract from the projected slight softening of the lumber markets.

The composite board markets tightened up substantially with several new mills coming on stream in Canada and the U.S.A. This has been one of the leading forest products growth areas. Minnesota has, for example, in the last ten years developed five panel board industries with an initial investment of over $200 million U.S. dollars. Interest in a Manitoba plant culminated with the announcement on January 8 that a feasibility study was under way for a waferboard plant to be established in the Swan River area. The funding for the study comes from the Pennco Group, a local Manitoba company from Steinbach. They have until the end of 1988 to determine if they wish to proceed with such a proposal.

Developments within the Manitoba forest products manufacturing segment of the industry were again very minimal this year. The most signficant event was the Manfor sawmill which established a new annual output in excess of 60 million board feet. This is a result of the redevelopment of their sawmill and the steadily gaining output level which allows them to set this new record. The provincial volume of timber utilized was not much different from last year as major users of timber were already running at or near their capacity.

TIMBER UTILIZATION

The harvest of timber from Provincial Crown Land totalled 1,854,337 m^3 for the 1987/88 fiscal year. The softwood component accounted for 1,688,032 m^3 while the hardwood component amounted to 166,305 m^3. This is 185,205 cubic metres more than the previous year and represents an increase of 11.1 per cent. The production of mine timber, lumber and pulpwood rose, but railway ties, poles, posts, fuelwood and round timber forest products declined.

The forest timber revenues rose to $2,961,462. which represents an increase of 10.4 per cent from the previous year. This is attributed to the rise in the volume of wood harvested as well as the slight increase in the timber dues.

The timber stumpage level was reviewed using the Manitoba Forest Products price index and resulted in an increase of 9.2 per cent over the 1984/85 base year. New dues schedules were calculated and the industry was advised that new dues rates came into effect on May 1, 1988.

A total of 5,510 timber permits were issued this fiscal year. This represents a decline of 451 permits from the previous year. This change in numbers is attributed to a reduction of interest in the public cut-your-own fuelwood program and post areas.

Thirty-six timber permit quotas were issued in 1986/87. This represents a reduction of one over the previous fiscal year. Timber sale quotas numbered 201, which is a decline of four from those in effect on April 30, 1987. This represents a decline of 68.1 per cent from the original 631 timber sale quotas first issued in 1965.

This year's Metric Scaling Course was held in Swan River and was attended by 21 candidates. Nineteen of the candidates completed the course and were recommended to receive a Manitoba Metric Scaling Licence Certificate.

Interest level in growing Christmas trees and woodlots developed throughout the year and culminated with the Department co-sponsoring another field day on the production of Christmas trees. Branch staff also assisted the Manitoba Forestry Association with this year's annual meeting on "Woodlots for Fun and Profit". In addition, a proposal was approved for a summer graduate student to investigate the level of interest in woodlots for consideration in the next round of Federal/Provincial Five Year Forestry Agreements.

TABLE 2

SUMMARY OF TIMBER CUT ON CROWN LAND 1987-88 (IN CUBIC METRES OF ROUND WOOD)

Product	Species	Cubic Metres		Percent
Lumber	Spruce, Pine, Fir, Tamarack, Cedar	655,380		
	Poplar, Birch and other hardwoods	77,889	733,269	39.54
Pulpwood	Spruce, Pine, Fir,	980,901		
	Poplar	26,981	1,007,882	54.35
Railway Ties	Pine		200	0.01
Line Poles	Cedar, Pine, Tamarack, Spruce		106	0.01
Fence Posts	Cedar, Pine, Tamarack, Poplar, Spruce, Oak		11,292	0.61
Round Timber	Spruce, Pine, Tamarack		15,301	0.83
Mining Timber	Pine, Spruce		1,714	0.09
Fuelwood	Birch, Poplar, Pine Spruce and other		84,573	4.56
	TOTAL 1987-88		1,854,337	100.00
	TOTAL 1986-87		1,669,132	

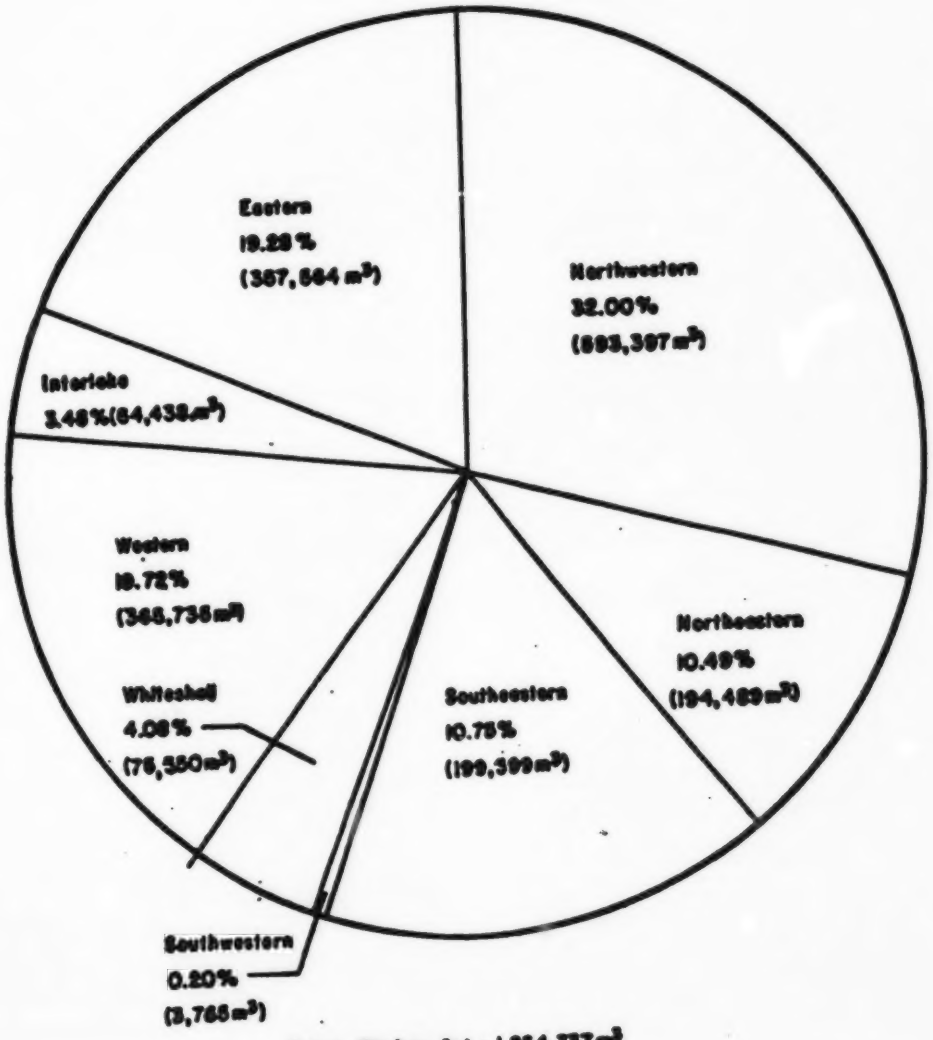
TABLE 3

TIMBER CUT BY DEPARTMENTAL REGION, 1987/88

Region	Cubic Metres	Percent
Northeastern	194,489	10.49
Northwestern	593,397	32.00
Southeastern	199,399	10.75
Whiteshell	75,550	4.08
Southwestern	3,765	0.20
Eastern	357,564	19.28
Interlake	64,438	3.48
Western	365,735	19.72
TOTAL	1,854,337	100.00

DIAGRAM #1

PERCENTAGE OF TIMBER PRODUCED WITHIN DEPARTMENTAL REGIONS
1987-88



Total Timber Cut : 1,854,337 m³

TABLE 4

RECORD OF TIMBER SCALED OR MANUFACTURED, 1987-88

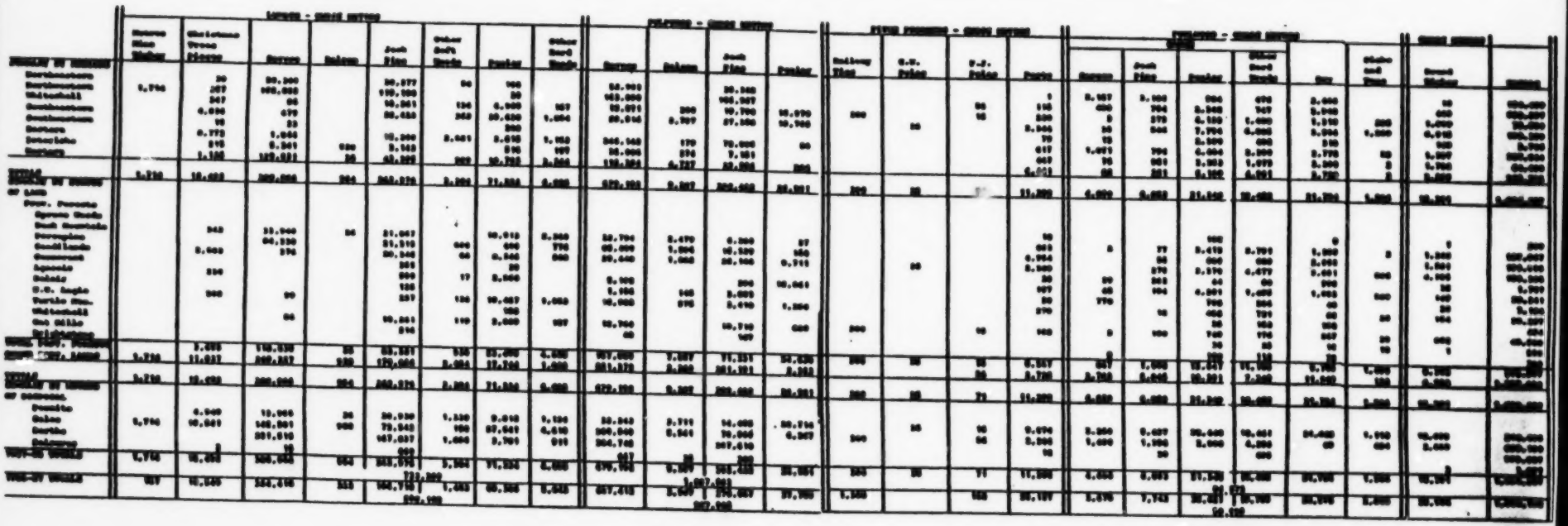


TABLE 5

REVENUE FROM THE SALE OF CROWN TIMBER

Year	Total Harvest (in cubic metres)	Revenue [1]
1973-74	1,588,759	843,081.37
1974-75	1,932,383	924,586.53
1975-76	1,851,552	1,739,308.27
1976-77	1,519,998	1,345,601.02
1977-78	1,646,562	1,176,078.00
1978-79	1,714,300	1,292,180.63
1979-80	1,940,082	1,624,290.86
1980-81	2,320,031	1,908,776.72
1981-82	1,782,078	1,792,589.82
1982-83	1,478,092	1,383,734.70
1983-84	1,500,332	1,964,510.80
1984-85	1,673,031	2,302,339.73
1985-86	1,688,897	2,473,081.25
1986-87	1,669,132	2,682,289.37
1987-88	1,854,337	2,961,462.33

(1) Dues in respect of Crown Timber Harvested

TABLE 6

SUMMARY OF ANNUAL FOREST PRODUCTION BY FOREST PRODUCT (IN CUBIC METRES) 1983-84 - 1987-88

Year	Pulpwood		Lumber		Fuelwood		Other		Total	
	Volume(m^3)	%	Volume(m^3)	%	Volume(m^3)	%	Volume(m^3)	%	Volume(m^3)	%
1983-84	837,756	55.8	509,476	34.0	102,474	6.8	50,626	3.4	1,500,332	100
1984-85	1,201,970	71.9	330,228	19.7	103,593	6.2	37,240	2.2	1,673,031	100
1985-86	1,065,361	63.1	474,826	28.1	110,561	6.5	38,149	2.3	1,688,897	100
1986-87	927,085	55.5	598,168	35.8	98,039	5.9	45,840	2.8	1,669,132	100
1987-88	1,007,882	54.4	733,269	39.5	84,573	4.6	28,613	1.5	1,854,337	100

TABLE 7

A COMPARISON OF PERMITS, LICENCES AND QUOTAS ON CROWN LANDS (INCLUDING PROVINCIAL FORESTS), 1986-87 AND 1987-88

	1986-87	1987-88
1. Timber Dealers and Sawmill Licences		
Timber Dealers	65	65
Sawmill Licences	112	113
2. Permits and Licences Covering Timber Cutting Rights		
PERMITS		
TIMBER SALE AGREEMENTS	5,961	5,510
Awarded	41	9
Previously Awarded	162	203
TOTAL	203	212
3. Timber Seizures Recorded	12	4
4. Timber Allocations in Force at March 31		
Timber Sales	205	201
Timber Permits	37	36
TOTAL	242	237
5. Forestry Revenue (Crown Charges)	$2,965,595.75	$3,282,283.76

TABLE 8

A COMPARISON OF PERMITS AND LEASES IN PROVINCIAL FORESTS, 1986-87 AND 1987-88

	1986-87	1987-88
1. General permits and leases		
Sawmill sites	3	-
Trappers cabins	45	38
Hunting and fishing cabins	3	4
Other lodges, cabins, residences	2	6
Grazing fences	-	-
Maintain roads and/or spurlines	3	1
Youth groups (camping and sports)	5	7
Land use for municipal purposes	6	8
Land use for government purposes	5	4
Miscellaneous	30	20
TOTAL	102	88
2. Hay Permits		
Number of permits	16	13
Tonnes of hay	236.86	206.58
3. Grazing permits		
Number of permits	3	3
Head of livestock	45	58

SILVICULTURE

The Forestry Branch and the forest industry were once again able to increase the forest renewal efforts on burned and cutover forested lands. A total of 15,240 hectares were treated with some form of silvicultural activity in 1987/88. This represented a 16 per cent increase over the 1986/87 program. Of this total, 50 per cent of the programs were carried out by the forest industry and 50 per cent by the Forestry Branch. The total area regenerated (planted or scarified for natural regeneration) was 7,318 hectares. This represents a 40 per cent increase over the previous year.

In the spring and fall of 1987, approximately 13.4 million bareroot and containerized seedlings were planted. This was an increase of 30 per cent over 1986/87. The Forestry Branch planted approximately eight million seedlings of which 60 per cent were planted using tendered tree planting contracts, with the balance being planted using departmental employees. As in the past, the planting contracts have proven to be very successful and economical and their use is expected to increase in the future. All of the mentioned seedlings were produced at the Pineland and Clearwater provincial forest nurseries with the exception of approximately 700,000 container seedlings which were grown by a private greenhouse contractor for Abitibi-Price Inc.

Mechanical site prepration for the 1988 planting program decreased by approximately 16 per cent. This slight decrease is a direct result of the requirement to refill some of the previous plantations and the Branch's intent to plant several areas without prior site preparation.

Scarification of cutovers for natural regeneration increased by 48 per cent. This method of forest renewal has proven to be very successful on many of the jack pine cutovers. Due to its cost effectiveness, this has become an integral part of the forest renewal program.

The Forestry Branch and forest industry used herbicides on an operational basis this year for both site preparation and for the release of plantations from vegetative competition. The total area treated increased by approximately 34 per cent over the 1986/87 program. A tragic accident occurred during the spray program in the Western Region when the spray helicopter crashed on the way to the spraying site, killing the pilot and his assistant. Approximately 50 per cent of the spray program in the Western Region that had not been completed at that time was subsequently cancelled.

Mechanical thinning or release was carried out on 1,076 hectares of older plantations and young natural stands. This is approximately a 300 per cent increase over the previous year as funding once again became available for these intensive management programs.

Silviculture surveys were carried out on 27,000 hectares of cutover and burned forested lands. This again identified the commitment of the Forestry Branch and forest industry in monitoring the new and existing plantations and identifying non-satisfactory stocked land that requires silvicultural treatments to bring them back into forest production.

The major focus of this year's cone collection program was to increase the inventory of white spruce seed in all major seed zones in the province. Early in the season it was identified that an extremely good white spruce cone crop was developing and that major strides could be made in expanding the white spruce seed inventory to a five to ten year supply. To accomplish this objective an aerial collection program using a helicopter and a cone rake was implemented in the Western, Interlake, and Eastern regions. The aerial collection in conjunction with additional ground collections provided over 530 hectolitres of white spruce cones. The yield of this cone crop proved to be excellent and the goal of increasing the white spruce seed inventory to a five to ten year supply was met.

PINELAND PROVINCIAL FOREST NURSERY

The Pineland Provincial Forest Nursery shipped approximately 9.59 million seedlings for the operational planting program, the woodlot program, and the operational research planting carried out by various sections of the Branch. This total consisted of 7.3 million bareroot seedlings and approximately 2.3 million containerized seedlings. This was a 63 per cent increase over the shipping in the previous year. The largest increase was in the bareroot seedling production where the technological changes made in the last two to three years have resulted in a greater number of quality bareroot seedlings being grown.

A major problem encountered with the increased bareroot production was the lack of cold storage facilities to hold the seedlings until they could be planted in the field. Supplementary cold storage facilities were rented in Winnipeg but due to the uncontrolled environment approximately 400,000 seedlings had to be destroyed because of deterioration in quality. With the completion of the new cold storage facility at the nursery in 1987, the storage problem should be eliminated.

Other major activities at the nursery included: transplanting 2.2 million bareroot seedlings; transplanting 700,000 containers to bareroot fields; converting three shade frames to cold frames for the production of transplant seedlings; constructing the dry storage building; and the fall lifting and packaging of 1.4 million bareroot seedlings and three quarters of a million containerized seedlings. These seedlings were then frozen in the new cold storage facility at -3 degrees celsius for the 1988 spring planting program. A total of 764 hectolitres of cones were processed to yield approximately 834 kilograms of seed.

CLEARWATER PROVINCIAL FOREST NURSERY

Clearwater Provincial Forest Nursery shipped 3.9 million containerized seedlings to Manfor Ltd. and the Northern Region. These crops were produced using the 20 greenhouses that are now operational at the nursery.

After a successful trial in growing Can AM multi-pot containers in 1987, and their excellent field performance, it was decided that all future crops would be switched over to this type of container from the existing paper pot container system. The major improvement in the survival and growth of the seedlings grown using this system warranted the expenditures in purchasing the new containers. With this conversion, both nurseries are now using the same container system.

To meet the projected 4.8 million seedling requirement in the spring and fall of 1988, 19 greenhouses were sown in June of 1987 for an overwintered crop. An additional seven greenhouses were sown in January of 1988 to produce the current container crop.

TREE IMPROVEMENT AND FOREST GENETICS

Throughout the year this project was expanded to include four major programs in four regions. Activities in each of these programs are outlined below:

1. Southern Region - Black Spruce

   Family test sites were identified and site prepared for planting in the spring of 1988. The container seedlings for these sites are now being grown in the tree improvement facility at the Pineland Provincial Forest Nursery.

2. Eastern Region - Black Spruce

   A cooperative effort between Abitibi-Price Inc. and the eastern region was made to collect scions and cones from black spruce plus trees in

the eastern breeding zone. Material from a total of 450 trees was collected, the seed extracted from the cones and grafted using the scion material. Family test sites and a seed orchard site were identified and will be site prepared in 1988.

3. Northern Region - Black Spruce

In conjunction with Manfor Ltd. and the northern region, cone and scion material was collected from 78 plus trees in the northern breeding zone. Seed from this collection was also extracted and scion material was grafted at Pineland Provincial Nursery. The seed orchard site was chosen and then cleared of merchantable wood by the northern region staff.

4. Western Region - White Spruce

In conjunction with the western region, cones were collected from 380 white spruce plus trees in the western breeding zone. All of these trees were flagged to collect the scion material at a later date.

The jack pine tree improvement program which is implemented by the Canadian Forestry Service under the Canada-Manitoba Forest Renewal Agreement was once again very active. The seed orchard site in the Interlake Region was site prepared in early April and planted by mid summer. Ongoing maintenance was carried out on the two jack pine seed orchards in the northern breeding zone. In the tree improvement facility at Pineland Nursery a container crop is being grown for an additional seed orchard in the eastern breeding zone.

TABLE 9

1987-88 FOREST RENEWAL ACTIVITIES

1987/88 Forest Renewal Activities	Province of Manitob Regional Program	Abitibi Price	Manfor
RENEWAL			
Trees Planted	7,714,000	2,601,000	3,081,000
Hectares Planted	3,193	1,254	1,247
Hectolitres of Cones Collected	659	37	157
Hectares Scarified for Natural Regeneration	741	nil	883
Hectares Site Prepared	2,507	1,401	1,568
Total Area Regenerated	3,934	1,254	2,130
STAND TENDING			
Hectares Mechanically Thinned or Released	415	200	461
Hectares Herbicided	342	558	70
Hectares Treated for Insect or Disease Infestation (not including jack pine budworm)	400	nil	nil

FOREST PROTECTION AND DUTCH ELM DISEASE

DUTCH ELM DISEASE

During the 1987 summer surveillance season, approximately 13,000 elms were examined in and around urban and rural municipalities. Of these, 1,133 were confirmed to have Dutch Elm Disease and 12,899 were classified as hazards, many of these probably dead as a result of Dutch Elm Disease (D.E.D.). This compares with the 2,948 confirmed D.E.D. trees the previous year and the additional 9,879 hazards. Due to the large numbers of elms infected in wild stands throughout southern Manitoba, particularly in eastern and central regions, control efforts were concentrated on elms in and around the 43 cost-sharing agreement communities. Trees in the wild were largely ignored due to the impracticality of controlling the disease in those areas.

The number of municipalities with D.E.D. remained at about 77 during the year. Communities with the disease included major urban centres like Winnipeg, Brandon, Portage la Prairie, Morden, Neepawa, Selkirk, Steinbach and Winkler. The disease is near Dauphin in the R. M. of Ste. Rose, however, Dauphin remained disease-free again this year.

Although D.E.D. continues to increase in the wild stands, diseased elms in urban centres with control programs were comparably low. Less than one per cent of Winnipeg's elms were diseased. In Brandon, less than two per cent of the elms were infected. Again, most of these trees are found in the wild stands along the riverbanks where control measures are less effective. The City of Winnipeg reported over 1,800 samples were taken this year, of which 1,645 were confirmed D.E.D. and an additional 6,585 were marked as hazards.

The disease has continued to increase along most of southern Manitoba's rivers. Large increases in disease have occurred on the Red

and Assiniboine rivers around Winnipeg, along the Assiniboine to Portage la Prairie and west of Brandon as far as the St. Lazare area. The Whitemud River around Westbourne has shown a considerable increase in disease as well as the east escarpment of Riding Mountain National Park. The smaller river and creek systems in south central Manitoba also experienced more pockets of infection, endangering the farm shelterbelts in the areas around Winkler, Altona, Morden and Carman. The Souris River southwest of Brandon was surveyed by air and reported to be extensively infected right into the United States and back into Saskatchewan. The elm population does, however, drop off just a few miles into Saskatchewan. It is expected that the disease will be exported to Saskatchewan via the Assiniboine River west of the St. Lazare area.

The community of Minnedosa which had one diseased tree in 1986 experienced one tree again this year. The Town of Rivers which had one tree last year was disease-free this year. Neepawa which had three diseased trees in 1984, none in 1985 and 1986, had one tree this year. Communities such as Portage, Morden, Morris, Ste. Anne and Souris saw a considerable increase this year as compared to last. Major decreases were observed in Brandon, Crystal City, Carman, and Stonewall. These communities have shown favourable results from sanitation practices which have included pruning and basal spraying.

The first diseased tree in rural Manitoba this year was observed in Morden on May 26 and in the Winnipeg area about June 4. A generally early spring with relatively low infestations of cankerworms, provided good conditions for sampling diseased trees. Most identification, however, was done in July and the first week of August.

From November 1, 1986 to October 31, 1987, the Provincial Dutch Elm Disease sanitation crew removed about 9,000 elm trees. In addition, approximately 2,550 decadent elms were removed in the Brandon Buffer Zone and 1,081 in the Winnipeg Buffer Zone (La Salle and Assiniboine River areas). These trees were removed under the winter works projects which ran from November 1986 to April 1987.

This year marked the fourth year of the Elm Guard watch program involving residents of both the City of Winnipeg and rural Manitoba communities. Elm Guard members are volunteers who regularly walk the streets of their area looking for early signs of D.E.D. Receptions for the volunteers are held locally at the end of each summer to recognize the efforts of these people.

SPRUCE BUDWORM

Spruce budworm infestations persisted along the Winnipeg River for the 13th consecutive season and into the Falcon-West Hawk areas of Whiteshell Provincial Park for the third consecutive season. Moderate to severe defoliation occurred throughout these areas. Light defoliation occurred in Hecla Island Provincial Park.

An aerial spray program using the bacterial insecticide Thuricide 48LV (Bacillus thuringiensis) was carried out at Dorothy Lake and Falcon Lake in Whiteshell Provincial Park. Control measures were recommended last fall following repeated budworm attack, and a survey predicting moderate and severe defoliation for 1987.

Pre-spray samples indicated larval numbers and shoot and larval development. This confirmed the necessity to spray and the timing for application.

The post-spray survey was completed five days after application. Samples were collected and branches assessed according to the same procedures used for the pre-spray survey.

The Whiteshell infestations are expected to continue in 1988. Aerial spraying will be considered again for the Dorothy Lake area and possibly Falcon Lake. Stand conditions will be assessed in the Falcon Lake area prior to a decision being reached. No control action is required for Hecla Island or the Grindstone Peninsula. The budworm and its impact will continue to be monitored in the Lake Winnipeg East area with the intent that harvesting plans be altered if warranted.

TABLE 10

SPRAY BLOCKS

Block #	Location	Size (ha)	Block Opening	Date Sprayed	Temp.	Relative Humidity	Wind km/hr
1	Dorothy Lk)	178	87/05/19	87/05/19	14°C	60%	5 SW
1A	Dorothy Lk)						
2	Dorothy Lk)	193	87/05/19	87/05/19	14°C	60%	Calm S.
3	Dorothy Lk)						
4	Falcon Lk	165	87/05/19	8/05/20	13°C	94%	Calm S.

TABLE 11

LARVAL SURVEY RESULTS

Treated Areas

Location	Pre-Spray Survey			Post-Spray Survey	% Larval
	Larvae/45 cm branch	Larval Index	Shoot Index	Larvae/45 cm branch	Reduction
Falcon Lake	13	2.7	3.7	20	-
Dorothy Lake	18	3.0	4.5	17	-
Untreated Areas					
Falcon Lake	30	2.7	4.2	37	-
Dorothy Lake	14	3.0	4.4	15	-

JACK PINE BUDWORM

The major defoliator of jack pine in Manitoba is the jack pine budworm. Populations of this insect rise to epidemic proportions rapidly and are also subject to sudden collapse. Outbreaks generally last two to four years. Top-kill, growth loss and reduced vigor are the most common forms of damage. Tree mortality seems to occur when other stresses are involved.

The jack pine budworm caused severe defoliation of jack pine in the Thompson area in 1984 and in 1985. Decline and mortality continued to occur throughout the 1986 and 1987 growing seasons.

Jack pine budworm populations returned to endemic levels throughout most of the province in 1987/88. Moderate defoliation was observed at Brereton and West Hawk Lakes in Whiteshell Provincial Park.

Egg mass surveys were carried out on permanent plots located in high priority jack pine areas. Although egg mass counts are not complete, all samples processed to date predict nil to light defoliation for 1988.

During 1987/88 pheromone traps were placed at 12 permanent plot locations throughout the province. Moth captures were low at all locations.

An inventory cruise using Manitoba Forest Inventory survey system was carried out within the infestation area. In addition to volume data, information on tree conditions was collected for each of three crown levels.

A survey of felled trees was done to relate levels of decay to tree conditions. Another survey for white spotted sawyer beetle, a common secondary pest which causes reduced lumber quality, was carried out on

logs of the felled trees at a number of plot locations using the inventory cruise. Each log was sampled by removing one square foot of bark and counting the number of larvae and larva entrance holes.

The potential volume loss due to budworm in the surveyed area was 15.5 per cent of the total volume of jack pine available prior to the budworm damage. The results indicated dead and declining jack pine at 17.5 per cent.

A fairly high percentage of dead and declining trees are still sound and suitable for sawlogs and pulp at this time. Advanced decay - which does represent a volume loss - is still minimal. Consequently, the 15.5 per cent volume loss mentioned earlier is an expected loss rather than an actual loss. If damaged stands throughout the area can be harvested within the next several years, losses will be kept to a minimum.

TABLE 12

JACK PINE VOLUME DATA FOR INDIVIDUAL STANDS

Management Unit	Township and Range	Stand	Number of Plots	Average Age	Volume (m^3/ha) Total	Declining	Dead	Potential Volume Loss
84	73-5W	303	10	50	30.6	0.4	1.2	5.2%
85	74-5W	178	10	75	93.1	4.0	2.6	7.1%
85	74-5W	273	6	90	156.4	4.6	22.7	17.2%
85	76-2W	124	9	85	97.1	4.3	9.3	14.0%
87	75-5W	161	5	70	76.4	8.4	5.8	18.6%
87	75-5W	168	12	80	128.1	7.6	11.8	15.1%
87	75-5W	169	5	85	132.9	2.8	19.5	16.8%
87	76-4W	55	7	85	145.9	15.0	17.8	22.4%
87	76-4W	60	5	85	83.8	6.3	7.2	16.1%
87	76-4W	111	9	85	78.9	3.2	4.8	10.0%
87	76-4W	193	4	80	187.4	3.7	31.3	18.7%
87	76-4W	186	9	85	158.8	12.9	15.6	17.9%

$$\text{Potential Volume Loss} = \frac{\text{Declining + Dead}}{\text{Total}} \times 100\%$$

TABLE 13

JACK PINE TREE CONDITIONS FOR INDIVIDUAL STANDS

Management Unit	Township and Range	Stand	Dead or Declining Upper Crown	Dead or Declining Upper & Mid Crown	Whole Tree Decline	Tree Mortality	Combined Decline and Mortality
84	73-5W	303	---	---	2.8%	11.1%	13.9%
85	74-5W	178	13.3%	8.0%	6.7%	1.3%	8.0%
85	74-5W	273	25.0%	7.9%	4.7%	15.7%	20.3%
85	76-2W	124	42.3%	5.7%	5.7%	9.9%	15.5%
87	75-5W	161	---	3.7%	11.1%	11.1%	22.7%
87	75-5W	168	27.6%	12.4%	6.7%	9.5%	16.2%
87	75-5W	169	31.9%	---	2.3%	15.9%	18.2%
87	76-4W	55	26.5%	18.1%	10.9%	12.1%	22.9%
87	76-4W	60	2.8%	19.5%	8.4%	8.4%	16.7%
87	76-4W	111	20.0%	5.8%	4.3%	7.2%	11.4%
87	76-4W	193	25.0%	15.4%	2.0%	19.3%	21.2%
87	76-4W	186	4.5%	3.6%	9.1%	13.6%	22.7%

DWARF MISTLETOE

Dwarf mistletoe causes extensive damage in Manitoba, reducing both the quantity and quality of merchantable timber. Two species of dwarf mistletoe occur in the province; Arceuthobium americanum which attacks jack pine and A. pusillum which attacks white and black spruce. Since the spring of 1984, dwarf mistletoe surveys, research and operational sanitation projects have been carried out under the Canada-Manitoba Forest Renewal Agreement. The Agreement provides $280,000 per year for dwarf mistletoe management, over its five year duration.

A comprehensive aerial survey for jack pine dwarf mistletoe was conducted in early 1987 over the central portion of Manitoba. An event recorder was used to map 4,000 km^2 in the area near Grand Rapids. The information gathered was subsequently interpreted and transferred onto provincial cover-type maps. Subsequent ground truthing covered over 100 kilometres during which potential treatment sites and harvestable stands were identified.

A total of 60 permanent plots have been established in Manitoba to monitor dwarf mistletoe infections and the effect of various operational sanitation treatments on the parasite. Forty of these are located in the southern part of the province and 20 are located in the central region near Grand Rapids. These plots have now yielded over 5,000,000 pieces of information that are all on computer file. A mapping system has been adapted from a program developed at the University of Manitoba to allow the mapping of individual trees in the permanent plots and integration of all collected information.

Two research projects funded by the Canada-Manitoba Forest Renewal Agreement are being delivered by the University of Manitoba Botany Department. One study delves into pollen retention and dispersal, while the other studies the behavior of dwarf mistletoe infections in Manitoba jack pine stands to provide a conceptual understanding and data to develop a loss simulator model.

Operational projects in 1987/88 were limited to post-harvest sanitation of recent and backlog cutover areas. Sixty kilometres north of The Pas at Mitchell Lake, 130 hectares of old cutover have been cleaned of dwarf mistletoe and 650 hectares of recent clearcut have been treated at Talbot Lake, 150 kilometres east of The Pas.

The same type of sanitation project is underway in the Belair area, about 100 kilometres northeast of Winnipeg. The local Cottage Owner's Associations have also been encouraged to carry out sanitation work in their subdivisions.

A large fire at Wallace Lake this year completely obliterated the most easterly known infection of dwarf mistletoe.

ARMILLARIA ROOT ROT

Armillaria root rot continues to be a problem in some red pine plantations in eastern and southeastern Manitoba. The disease has been found in plantations ranging in age from five to 50 years. Activities during 1987/88 included monitoring of existing impact plots, a study to determine the susceptibilities of red pine and jack pine and the determination of high risk root rot areas prior to planting.

WHITE PINE WEEVIL

Sanitation pruning to control the white pine weevil, Pissodes strobi in white spruce plantations in the Interlake Region of Manitoba continued for the fourth consecutive year. In 1987 a total of 1,961 infested white spruce trees were pruned over a 335 hectare area.

Detecting the white pine weevil was difficult during 1987 due to a late frost. An additional problem arose when weevils reinvaded previously attacked stems. As a consequence, all trees displaying old damage had to be re-examined for 1987 weevil attack.

PLANTATION PEST SURVEY

The summer of 1987 was the initial year for the Plantation Pest Survey carried out jointly by the Canadian Forestry Service and Manitoba Natural Resources. This survey is intended to determine major planatation pests causing deformity and/or mortality in young stands. More detailed impact studies and/or pest management decisions will be based on these initial surveys.

The survey in 1987 was conducted on seven plantations of either red pine or jack pine, and covered 159 hectares, 1,464 trees, of which 89 per cent were classified as vigorous. The jack pine stands had more problems which were mainly Western Gall Rust and Pitch Nodule Maker. The red pine plantations had no major, but a few minor problems.

A grid pattern survey method was used to cover the entire plantation systematically. It allowed the surveyors to draw accurate maps and to locate and estimate the percentage of occurrences of pockets of mortality and/or damage. A 4m x 10m temporary plot was established every 80m along the compassed grid lines, and all trees dead or alive with the plot boundaries were assessed. The 1987 season was a trial period for this new project and modifications in the survey method and sampling intensity are planned for the 1988 season.

THE FORESTRY INITIATIVES

ANNUAL REPORT

1987-1988

MANITOBA NATURAL RESOURCES

THE FORESTRY INITIATIVES

The Forestry Initiatives Program consists of both the Canada-Manitoba Forest Renewal Agreement (ERDA) and the Jobs Fund Sectoral Project in Forestry. Each component of this program has similar objectives, goals and detailed project areas. The "Jobs Fund" is the current provincial funding source for this program.

The primary objective of the Forestry Initiatives is to improve the level of forest management so that the timber supply capability within the province will match industry's demands for the resource.

Both the Agreement and the Sectoral Project are divided into four program areas. They are:

- forest renewal;
- intensive forest management;
- applied research, technology transfer, opportunity identification and nursery development; and
- public information, evaluation and administration.

CANADA-MANITOBA FOREST RENEWAL AGREEMENT

Under the Canada-Manitoba Forest Renewal Agreement, projects are implemented in three ways. Some projects are carried out by the Federal government, some exclusively by the Provincial government, and some are cost-shared. Under the provincial side, the cold storage building at Pineland Nursery was completed, 6.8 million bareroot seedlings were shipped and 1.9 million seedlings were planted. Also in the provincial-direct program, 128 ha of jack pine were treated in the Mitchell Lake area for dwarf mistletoe while an additional 644 ha were treated in the Talbot Lake area. The contract with the University of Manitoba for the development of a loss simulator model for dwarf mistletoe on jack pine is continuing and 314.5 ha were treated with herbicide in the Eastern and Western regions. Manitoba also contributed to a national communications strategy focused on improving

the awareness of the forest sector in the country. This was complemented by Manitoba hosting the Canadian Forest Communications Committee in Winnipeg in May of 1987. Public information activities also included the official opening of the Clearwater Nursery facilities in May and the tree improvement facility at Pineland in June of 1987. The Province is continuing to load the geographical information system and there are currently 424 map sheets in various stages of production.

Information included in this section of the Agreement is also found in the pertinent sections of this report that refer to silviculture, forest management.....

The Federal component involved the two companies - Abitibi-Price Inc. and Manfor acting as delivery agents for the program. A total of 3,812 ha were surveyed, over 1,700,000 trees were planted, and 566 ha were site prepared. In addition, 547 ha of spacing was carried out while 431 ha were treated with herbicides. A seed orchard for 20,000 jack pine seedlings was prepared and planted in the Interlake. A book titled "Tree and Shrub Insects of the Prairie Provinces" was published. The Federal component of the Agreement also partially funded a tabloid called "The Forestry Leader" and was involved in exhibitions in 14 communities during the summer.

The third component of the Agreement is the cost-shared areas. Under this program, many applied research programs were implemented. This included evaluating the effects of aerial applications of glyphosate on both vegetation and aquatic ecosystems. The Demonstration Area Manual was produced and distributed. This manual highlights areas of significant importance to forest research in Manitoba's silvicultural field. Under the forest economics program, a number of time and motion studies were undertaken through contract with a consultant and a report "Machine Productivity for Disk Trenchers, Drum Choppers and Bracke Scarifiers in Manitoba" was produced. In

the new tree improvement facility at Pineland, 27,000 seedlings were seeded and grown. This is equally divided between white spruce, black spruce and jack pine. An additional 36,000 seedlings were grown for a mass selection seed orchard. Under growth and yield and site classification, 15 plots (which include over 9,000 trees) were measured. A number of computer programs and instruction manuals were developed, edited and then tested. A financial summation by program is found on Table 14.

JOBS FUND SECTORAL PROJECT IN FORESTRY

The sectoral project is the completely provincial component of the program, managed and delivered in much the same fashion as the Agreement. Projects listed here will also be found in other sections of this Branch report. Under this program over 3,000,000 trees were planted in the Eastern and Western regions, and over 2,200 ha were scarified in various regions for regeneration. The geographical information system being loaded under the Agreement was complemented by this program where an additional 84 map sheets have been completed. At Pineland Provincial Forest Nursery, 1.4 million containerized seedlings were grown in 14 greenhouses and at Clearwater Provincial Forest Nursery, an additional 1.6 million seedlings were prepared for the 1987 planting season.

Under the public information component of this program, six refrigerated vans were repaired and painted with a "Trees for Tomorrow" mural to be used for the transportation of the seedlings; a new scaler's manual was prepared, provincial tree ballots for the development of a new provincial tree were initiated and the Forestry Branch's Five Year Report was reprinted to meet the demand. In addition, six display panels for silviculture, some 1,200 posters geared for school children for an Annual Poster Contest for Forest Week and an animated Smokey the Bear public service announcement were also completed. An annual expenditure breakdown by program is included in Table 14.

TABLE 14

MARCH 31, 1988

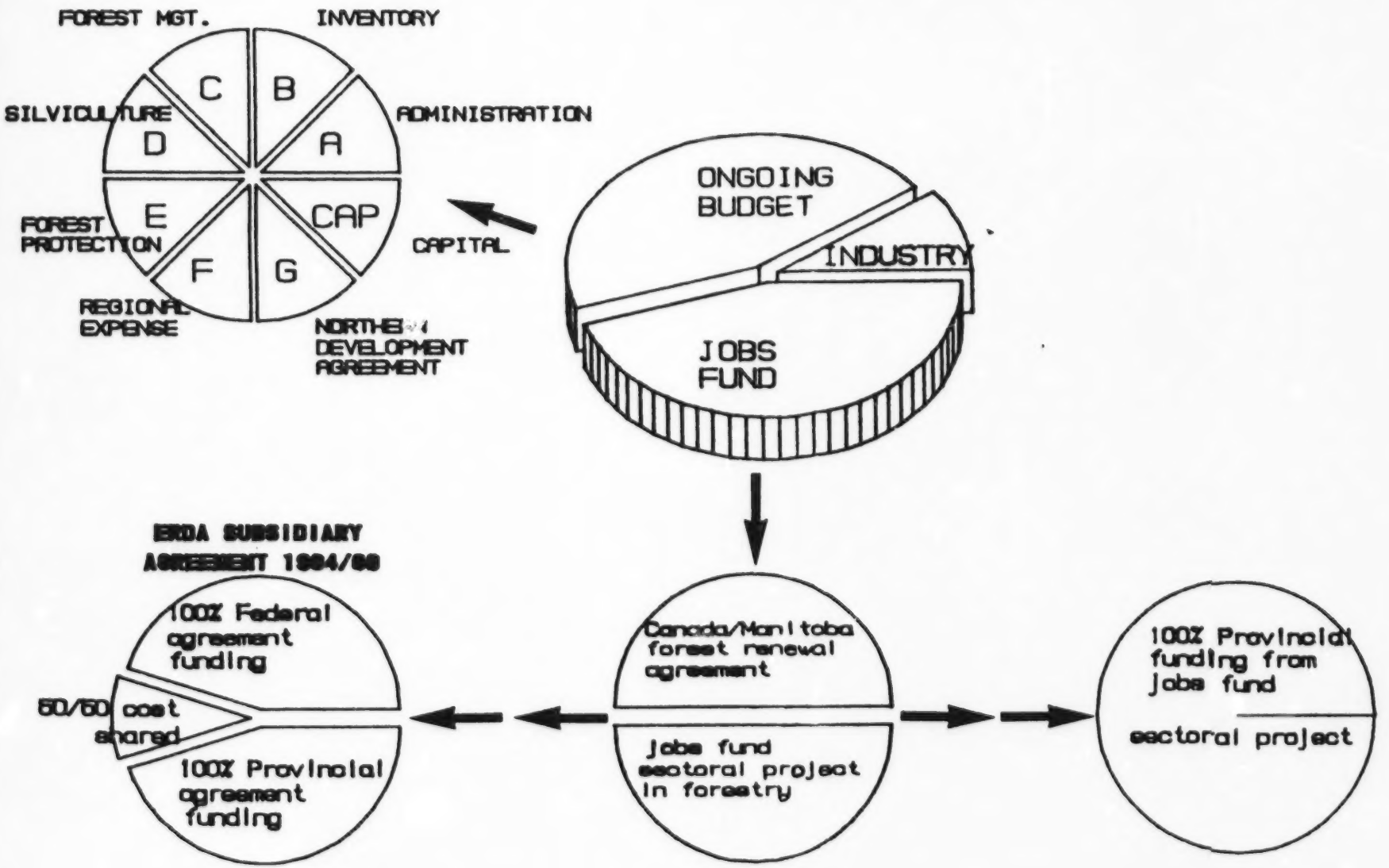
SUMMATION BY PROGRAM

(000's)

CANADA MANITOBA FOREST RENEWAL AGREEMENT	100% PROVINCIAL ALLOTTED	100% PROVINCIAL EXPENDED	50/50 ALLOTTED	50/50 EXPENDED	FEDERAL ALLOTTED	FEDERAL EXPENDED
PROGRAM "A" Forest Renewal	$1,198.0	$1,195.5	-	-	$820.9	$819.9
PROGRAM "B" Intensive Forest Management	280.0	278.4	-	-	472.3	472.0
PROGRAM "C" Applied Research, Tech Transfer, Opport. Ident & Nursery Develop	956.0	954.6	$700.0	$683.9	562.4	559.1
PROGRAM "D" Public Information, Evaluation and Administration	6.0	5.6	-	-	251.9	251.9
AGREEMENT TOTALS 1987/88	$2,440.0	$2,434.1	$700.0	$683.9	$2,107.5	$102.9
JOBS FUND SECTORAL PROJECT						
PROGRAM "A" FOREST RENEWAL	$552.4	$552.6				
PROGRAM "B" INTENSIVE FOREST MGMT.	2,204.3	2,164.8				
PROGRAM "C" NURSERY DEVELOPMENT	708.6	714.3				
PROGRAM "D" PUBLIC INFORMATION	144.7	144.6				
SECTORAL TOTALS 1987/88	$3,610.0	$3,576.3				
GRAND TOTALS	$6,050.0	$6,010.4	$700.0	$683.9	$2,107.5	$2,102.9

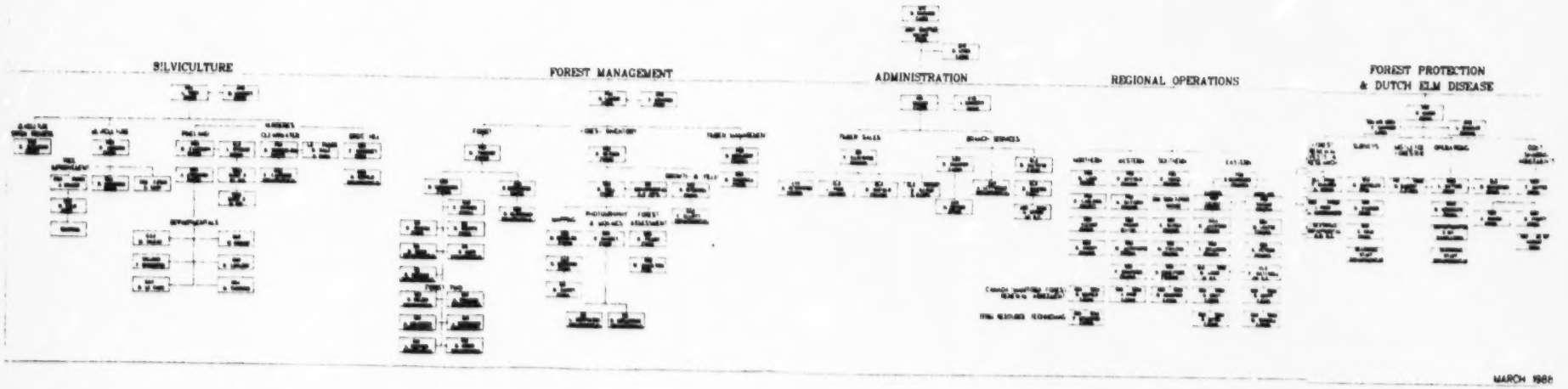
DIAGram 2

FORESTRY ACTIVITY



MANITOBA FORESTRY BRANCH NOTE: The size of each segment does not necessarily reflect the size of financial commitment.

FORESTRY BRANCH ORGANIZATION CHART



MARCH 1988